



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/708,517	11/09/2000	Gordon W. Braudaway	YO-99-397	1743
30743	7590	01/11/2005	EXAMINER	
WHITHAM, CURTIS & CHRISTOFFERSON, P.C. 11491 SUNSET HILLS ROAD SUITE 340 RESTON, VA 20190			LEE, TOMMY D	
			ART UNIT	PAPER NUMBER
			2624	

DATE MAILED: 01/11/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/708,517	Applicant(s) BRAUDAWAY ET AL.	
	Examiner Thomas D. Lee	Art Unit 2624	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 02 August 2004.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☒ Claim(s) 3-5 is/are allowed.
- 6) ☒ Claim(s) 1,2 and 6-17 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

1. This Office action is responsive to applicant's amendment filed August 2, 2004. Claims 1-17 are pending.

Claim Rejections - 35 USC § 102

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Claims 1, 6, 8-14, 16 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,760,925 (Saund et al.).

Regarding claims 1, 6 and 8-11, Saund et al. disclose a method for correcting distortion in an image of a scanned document, comprising: physically placing a reference pattern on a page (light-stripe source projects image of a slit onto a bound document (column 6, lines 28-35)); obtaining an image of said page containing printed information at least a portion of which is distorted (image acquisition system acquires image of bound document (column 7, lines 52-54)); detecting said reference pattern in the image indicative of the distortion (light stripe projected across bound document acquired by image acquisition system (column 7, lines 49-51)); computing an amount of the distortion in said image by analyzing the detected reference pattern (image processing system determines page shape transform using light stripe image (column 7, lines 57-60)); and correcting the distortion in said image based on the amount of distortion computed in said computing step (image of bound document de-warped to form corrected image (column 7, lines 60-63)). Said reference pattern includes a series

Art Unit: 2624

of markings having a predetermined spatial relationship (noting Fig. 1, light stripes 5 and 6 have a predetermined spatial relationship; in alternative embodiment, a grid (series of intersecting horizontal and vertical lines having predetermined spatial relationship) may be projected onto bound document (column 6, lines 38-42)). The method further comprises: deleting said reference pattern from said image (image of bound document acquired when light stripe projection system is turned off (column 7, lines 51-54)); and outputting said image as a corrected image free of said distortion (corrected image data stored or output directly to a peripheral device (column 7, lines 29-34)). Said outputting step includes one of printing said corrected image, transmitting said image along a communication line, and storing said image in a computer (corrected image data stored or output directly to a peripheral device (column 7, lines 29-34)). Said distortion results from a curvature located in an interior portion of said page (distortion caused by curvature of a page in the vicinity of the binding (column 1, lines 43-46)). Said page is a page in a bound volume and the distortion in said page results from a curvature in said page caused by a binding of said bound volume (column 1, lines 43-46).

Regarding claims 12-14 and 16, Saund et al. disclose a distortion correction processor adapted for use with a digital imaging device, said distortion correction processor comprising: an optical recognition unit which locates a reference pattern in a document image (light stripe projected across bound document acquired by image acquisition system (column 7, lines 49-51) with internal optics (column 6, lines 6-14)); a distortion computation unit which determines an amount of the distortion in said image

Art Unit: 2624

by analyzing said reference pattern (image processing system determines page shape transform using light stripe image (column 7, lines 57-60)); and a bitmap processor which corrects the distortion in said image based on the amount of distortion computed by the distortion computation unit (image of bound document de-warped by image processing system to form corrected image (column 7, lines 60-63)). The reference pattern is located at a predetermined position within the image (noting Fig. 1, light stripes 5 and 6 located at a predetermined position with respect to bound document 10); and includes a series of markings having a predetermined spatial relationship (light stripes 5 and 6; in alternative embodiment, a grid (series of intersecting horizontal and vertical lines having predetermined spatial relationship) may be projected onto bound document (column 6, lines 38-42)). Said optical recognition unit locates a second reference pattern in said document image at a second location within said image (light stripe 5 represents first reference pattern, and light stripe 6 represents second reference pattern); wherein said distortion computation unit computes an amount of the distortion in said image by analyzing said reference pattern and said second reference pattern (light stripes 5 and 6 used in determining amount of distortion (column 13, lines 26-42)); and wherein said bitmap processor corrects distortion in said image based on the amount of distortion computed by said distortion computation unit (image of bound document de-warped by image processing system to form corrected image (column 7, lines 60-63)).

Regarding claim 17, Saund et al. disclose a digital imaging system, comprising: a document having a reference pattern (light stripe projected across bound document

Art Unit: 2624

acquired by image acquisition system (column 7, lines 49-51)); an optical scanner which scans said document to obtain an image, said image containing distortion resulting from curvature of said document on a support surface of said optical scanner (image acquisition system acquires image of bound document (column 7, lines 52-54)); a distortion correction processor which receives said image from said optical scanner, said distortion correction processor including: (a) an optical recognition unit which locates said reference pattern in said image (light stripe projected across bound document acquired by image acquisition system (column 7, lines 49-51) with internal optics (column 6, lines 6-14)); (b) a distortion computation unit which determines an amount of the distortion in said image by analyzing said reference pattern (image processing system determines page shape transform using light stripe image (column 7, lines 57-60)); (c) a bitmap processor which corrects the distortion in said image based on the amount of distortion computed by the distortion computation unit (image of bound document de-warped by image processing system to form corrected image (column 7, lines 60-63)); and an output for outputting the corrected image to an output device (corrected image data stored or output directly to a peripheral device (column 7, lines 29-34)).

Claim Rejections - 35 USC § 103

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
5. Claims 2, 7 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Saund et al.

Art Unit: 2624

Regarding claim 2, Saund et al. do not disclose printing reference patterns (light stripes 5 and 6) on said page (bound document 10). However, with light stripe projection system turned on, the light stripes projected across the bound document are acquired by the image acquisition system (column 7, lines 48-51). This is functionally equivalent to printing the light stripes onto bound document, since the image acquisition system obtains the light stripes as they appear on the document, for the purpose of determining the amount of curvature of the document. So long as the amount of curvature is detected by the image acquisition system, it makes no difference whether or not the light stripes are physically printed onto the document. Therefore, printing the light stripes would have been an obvious modification of Saund et al. to one of ordinary skill in the art.

Regarding claims 7 and 15, Saund et al. disclose that, in an alternative embodiment, a grid (series of intersecting horizontal and vertical lines having predetermined spatial relationship) may be projected onto bound document (column 6, lines 38-42). Whether the lines are equidistantly spaced is not specifically mentioned, but one of ordinary skill in the art would have recognized that the horizontal and vertical lines of a grid may or may not be equidistantly spaced as a matter of design choice, so long as the curvature of the document is detectable, and thus it would have been obvious to provide a series of equidistantly spaced lines or bars as another method for measuring the surface shape of a bound document.

Allowable Subject Matter

6. Claims 3-5 are allowed.

Art Unit: 2624

7. The following is a statement of reasons for the indication of allowable subject matter: No prior art has been found to disclose or suggest attachment of one or a plurality of strips containing a reference pattern at predetermined locations and orientations to a page, for determining page distortion, as recited in claims 3 and 4.

Claim 5 depends from claim 4.

Response to Arguments

8. Applicant's arguments filed in response to the rejection of claims 1, 6, 8-14, 16 and 17 under 35 U.S.C. 102(b), and claims 2, 7 and 15 under 35 U.S.C. 103(a) have been fully considered but they are not persuasive.

On pages 9 and 10 of applicant's response, applicant states that Saund et al. do not teach a method for correcting distortion in an image of a scanned document, comprising: placing a reference pattern on a page. Applicant states that Saund et al. requires complicated specialized hardware equipment, such as light projectors, while the claimed invention relies on physically printing or placing reference patterns onto the document to be copied. However, the term "physically" may be broadly interpreted as describing any action performed by a user or machine that causes the placement of the reference patterns onto the surface of the document. Turning on the light projectors, in itself, is a physical activity that causes placement of a light stripe on the document.

Applicant further asserts that Saund et al. do not disclose "obtaining an image of said page containing printed information at least a portion of which is distorted."

Specifically, applicant states that Saund et al. teach acquisition of an image "without the projection of a light stripe across it," while the claimed invention claims "detecting said

Art Unit: 2624

reference pattern in the image indicative of the distortion.” It should be noted that applicant’s reference to step 118 (image acquired without the projection of a light source) is preceded by a step 114, where the image is acquired with the projection of the light source, and thus the light stripe is detected in the image indicative of the distortion.

Applicant asserts, at page 11 of applicant’s response, that Saund et al. do not disclose “detecting said reference pattern in the image indicative of the distortion.”

Applicant states that there is no reference in the claims of a light stripe such as taught by Saund et al. However, applicant does recite a reference pattern, which is broadly interpreted as any pattern that reveals a distortion in a scanned document. The light stripe disclosed in Saund et al. fits this interpretation.

Applicant further asserts that Saund et al. do not disclose “computing an amount of the distortion in said image by analyzing the detected reference pattern.” Applicant states that in Saund et al. two images are employed (one with light stripe and one without), while the claimed invention works with a single image “by analyzing the detected reference pattern.” However, it should be noted that the claims do not recite the analysis of only one image. In Saund et al. two images are analyzed, one of which includes the light stripe, thereby anticipating the claimed limitation.

Applicant asserts, at pages 12 and 13 of applicant’s response, that Saund et al. do not disclose “correcting the distortion in said image based on the amount of distortion computed in said computing step.” Applicant again states that in Saund et al. two images are employed (one with light stripe and one without), while the claimed invention

Art Unit: 2624

works with a single image. However, as mentioned above, the claims do not recite the analysis of only one image. In Saund et al. two images are analyzed, one of which includes the light stripe, thereby anticipating the claimed limitation.

Applicant further asserts that Saund et al. do not disclose "[s]aid reference pattern include a series of markings having a predetermined spatial relationship." However, as indicated on page 4 of the prior Office action, at lines 12-14, Saund et al., at column 6, lines 38-42, disclose a grid (series of intersecting horizontal and vertical lines having a predetermined spatial relationship) may be projected onto the bound document.

Applicant asserts, on pages 13 and 14 of applicant's response, that Saund et al. do not disclose "deleting said reference pattern from said image ... and outputting said image as a corrected image free of said distortion ... [s]aid outputting step [potentially] includes one of printing said corrected image, transmitting said image along a communication line, and storing said image in a computer." Contrary to applicant's assertion, these limitations are disclosed in Saund et al. (image of bound document acquired when light stripe projection system is turned off (column 7, lines 51-54), which is equivalent to deletion of the reference pattern from the document; corrected image data stored or output directly to a peripheral device (column 7, lines 29-34)).

Applicant asserts, on pages 14 and 15 of applicant's response, that Saund et al. do not disclose "[s]aid distortion results from a curvature of a page in the vicinity of the binding" and "[s]aid page is a page in a bound volume and the distortion in said page results from a curvature in said page caused by a binding of said bound volume."

Art Unit: 2624

Contrary to applicant's assertion, these limitations are clearly taught by Saund et al. (distortion caused by curvature of a page in the vicinity of the binding (column 1, lines 43-46)).

On pages 15 and 16 of applicant's response, applicant states that Saund et al. do not teach a "distortion correction processor," "adapted for use with a digital imaging device," "an optical recognition unit" or "locates a reference pattern in a document image." In particular, applicant states that Saund et al. teach "a high resolution digital color camera having internal optics," which is not analogous to applicant's "digital imaging device." However, no such analogy is made in the prior Office action. The image acquisition system disclosed in Saund et al. is analogous to applicant's *optical recognition unit* (note sentence bridging pages 3 and 4 of the prior Office action). The internal optics of the image acquisition system are emphasized in order to qualify the image acquisition system as an optical unit.

On page 16 of applicant's response, applicant states that Saund et al. do not teach "a distortion computation unit which determines an amount of the distortion in said image by analyzing said reference pattern." In particular, applicant states that Saund et al. teach the acquisition of two distinct images, one acquired with light strip turned on and one acquired with light stripe turned off, which the claimed invention uses only one image. However, the claims are not limited to the use of "only one" image. The recitation of "a reference pattern" does not relegate a user to the use of only one reference pattern. Regardless of whether one or more reference patterns are used in the applicant's invention, applicant's "a reference pattern" reads on the light stripe

Art Unit: 2624

disclosed in Saund et al., since the light stripe is a line pattern that is used to determine image distortion.

On pages 16-17 and 21 of applicant's response, applicant states that Saund et al. do not teach "a bitmap processor which corrects the distortion in said image based on the amount of distortion computed by the distortion computation unit." In particular, applicant states that there is no reference in the cited portion of the disclosure of Saund et al. of "bitmap processor," or "corrects the distortion in said image based on the amount of distortion computed by the distortion computation unit." However, on page 4, lines 7 and 8, of the prior Office action, the examiner states that Saund et al., at column 7, lines 60-63 of the cited reference, state that the image of a bound document is de-warped by the image processing system to form a corrected image. The de-warping of the image to form a corrected image, as performed by the distortion correction processor of Saund et al., is analogous to applicant's bitmap processor for correction of distortion based on a computed distortion amount.

On pages 17 and 18 of applicant's response, applicant states that Saund et al. do not teach "[t]he reference pattern is located at a predetermined position within the image." In particular, applicant states that the disclosure of Saund et al. employs light stripes, which is not a reference pattern located at a predetermined position within said image. Contrary to applicant's assertion, the light stripes disclosed in Saund et al. are analogous to such a reference pattern, for the light stripe is a type of pattern that is captured by the optical recognition unit. The stripe's position is predetermined by the

Art Unit: 2624

positioning of the light stripe projection system 22 with respect to the bound document containing the image.

On pages 19 and 20 of applicant's response, applicant states that Saund et al. do not teach "a series of markings having a predetermined spatial relationship." However, as indicated on page 4 of the prior Office action, at lines 12-14, Saund et al., at column 6, lines 38-42, disclose a grid (series of intersecting horizontal and vertical lines having a predetermined spatial relationship) may be projected onto the bound document. And while applicant asserts that light stripes in the teaching of Saund et al. is not analogous to physical markings, it should be noted that "physical" markings are not recited in the claims.

On pages 20 and 21 of applicant's response, applicant states that Saund et al. do not disclose "[s]aid optical recognition unit locates a second reference pattern in said document image at a second location within said image ... wherein said distortion computation unit computes an amount of the distortion in said image by analyzing said reference pattern and said second reference pattern." Contrary to applicant's assertion, light stripes 5 and 6 as disclosed in Saund et al. are used for computing, by the distortion computation unit, an amount of distortion in an image (column 13, lines 26-42). Applicant continues to assert that Saund et al. teach the acquisition of two distinct images, while the claimed invention uses only one image. However, the recitation of a second pattern in claim 16 clearly contradicts such an assertion.

On pages 22-24 of applicant's response, applicant merely reiterates the arguments of pages 15-21. These arguments have been addressed above. Applicant

Art Unit: 2624

further states that Saund et al. do not disclose "an optical scanner which scans said document on a support surface of said optical scanner," asserting that the very title of Saund et al. declares itself to be "platenless." However, claim 17 merely recites "a support surface of said optical scanner." This limitation clearly reads on platform 8 of the bound document scanning system 4 (Fig. 1; column 5, lines 56-58).

For the foregoing reasons, the arguments presented by the applicant regarding claims 12-14, 16 and 17 are not deemed persuasive.

As for claims 2, 7 and 15, the applicant continues to assert that the claim involves physically marking reference patterns, which would render the invention of Saund et al. "inoperable for its intended purpose." However, these claims do not recite a "physical" marking, and thus this argument is not persuasive, either. As best, claims 2 and 7 depend from claim 1, which recites physically placing a reference pattern on a page, but as mentioned above, the term "physically" may be broadly interpreted as describing any action performed by a user or machine that causes the placement of the reference patterns onto the surface of the document. Turning on light projectors, in itself, is a physical activity which causes placement of a light stripe on the document.

Conclusion

9. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not

Art Unit: 2624

mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Thomas D. Lee whose telephone number is (703) 305-4870. The examiner can normally be reached on Monday-Friday (7:30-5:00), alternate Fridays off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on (703) 308-7452. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Art Unit: 2624

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Thomas D. Lee
Primary Examiner
Art Unit 2624

tdl
January 6, 2005